4 SCREENING FOR DRUGS USING THE ABBOTT TDx OR TDx/FLx

4.1 Summary

4.1.1 The Abbott TDx and TDx/FLx are automated semi-quantitative reagent systems designed for the detection of drugs of abuse and quantitative reagent systems designed for therapeutic drug monitoring. The assays, utilizing Fluorescence Polarization Immunoassay (FPIA) technology, have been modified for use with primarily whole blood samples which are diluted with buffer and tested against calibrators and controls using either Abbott System. The result obtained is presumptive, meaning that any "positive" result requires appropriate confirmation.

4.2 Specimen Requirements

4.2.1 Approximately 0.5 mL of whole blood, biological fluid or 0.5 g tissue dilutions/homogenates

4.3 Reagents and Standards

4.3.1 Abbott TDx reagent packs: Amphetamine/Methamphetamine II, Barbiturates IIu, Benzodiazepines, Cocaine Metabolite, Cannabinoids, Opiates, Phencyclidine II, Tricyclic Antidepressants, Methadone, Propoxyphene, Acetaminophen, Salicylate, Phenytoin, Valproic Acid, Carbamazepine.

4.3.2 Abbott TDx dilution buffer.

4.4 Solutions, Internal Standard, Calibrators, Controls

4.4.1 Abbott TDx assay specific calibrators

4.4.2 Abbott TDx assay specific controls

4.4.3 Abbott TDx multi-constituent controls for drugs of abuse assays

4.4.4 Drug-free negative whole blood control (blood bank blood previously determined not to contain drugs)

4.5 Apparatus

4.5.1 Abbott TDx System or Abbott TDx/FLx System

4.6 Procedure

4.6.1 Perform all daily start-up procedures according to the System Operations Manual and record in the Maintenance Log. Calibrate when controls fall out of range (see System Operations Manual for ranges).

4.6.2 Load the carousel wheel with the correct number of sample cartridges and cuvettes.

4.6.3 Pipet approximately 100 µL of Abbott commercial calibrator or control into the first and last sample wells. Other controls may be added.

4.6.4 Pipet 100 µL of dilution buffer into case sample wells. Do not add buffer to the Abbott calibrator/control sample wells.

4.6.5 Pipet 50 µL of sample or negative whole blood control into appropriate sample wells containing 100 µL buffer, mixing the sample with the buffer while pipetting, to prepare a 1:3 dilution. Remove any air bubbles. Use fresh tips for each addition. . *Note: The opiate assay may be prepared as a 1:4 dilution using 150 µL of buffer.

4.6.6 Invert the reagent pack gently five times. Unscrew the caps from the reagent vials and remove any air bubbles that may have formed.

4.6.7 Load the carousel wheel and reagent pack into the instrument, close the access door, and press "RUN".

4.6.8 Enter the reagent lot number when the display reads "RGT#?" and hit “STORE.” Enter the sample ID number when the display reads "ID 1?" and hit “STORE”, and so on for each sample being run. Verify that the correct assay name is displayed. When the run is complete, the instrument displays "DONE-REMOVE RPAK" and alerts with a beep.

4.7 Calculation

4.7.1 Multiply the result by the dilution factor. Label result positive or negative. A positive result must have a quantitative value equal to or greater than the cut-off.

4.7.2 Repeat any sample that gives the result "NET I SMALL" on a larger dilution.

4.7.3 With appropriate confirmation, quantitative acetaminophen, salicylate, phenytoin, valproic acid and carbamazepine results may be reported.

4.8 Quality Control and Reporting

4.8.1 Calibrator and control values must be within the concentration ranges specified in the “Reagent” section of each Abbott reagent kit insert.

4.8.2 Drug of abuse assays are qualitative screening tests and therefore the run may be accepted even if the medium and high controls are not within the targeted concentration range provided the low control falls within the specified concentration range.

4.8.3 Photocopy results for each case file. Record result on the Case Cover Sheet and file the photocopy in the case file. Original results are stored in one of the case files analyzed within the run.

4.8.4 With appropriate confirmation, quantitative acetaminophen, salicylate, phenytoin, valproic acid and carbamazepine results may be reported.

4.9 Notes

4.9.1 The laboratory must have data establishing cutoffs for each immunoassay. Cutoffs are established by spiking negative blood samples with a series of drug concentrations near the desired limit of detection. By comparing results of known negative blood and the series of concentrations, a cutoff is established. The cutoff is validated by reanalyzing samples previously quantitated by GCMS. In addition, cutoffs may be adjusted by monitoring positive screen results versus GCMS quantitations and confirmations to reduce false positives and false negatives. Occasionally, with significant changes in reagents (new tracer pool, antiserum, lot number), cutoffs may have to be reestablished.

4.9.2 Each FPIA assay has different cross-reactivities with drugs within the same class, so cutoffs need to take into consideration therapeutic levels of drugs as well as their cross reactivity with the reagents.

4.9.3 The cutoffs were established to detect the following concentration of drugs in whole blood samples:

FPIA Assay	Target Analytes	Blood Concentration (mg/L)
Amphetamine/ Methamphetamine II	Amphetamine	0.05
	Methamphetamine	0.05
	3,4-Methylenedioxymethamphetamine	0.05
	Methylenedioxyamphetamine	0.05
Barbiturates IIu	Amobarbital	0.5
	Butabarbital	0.5
	Butalbital	0.5
	Pentobarbital	0.5
	Phenobarbital	0.5
	Secobarbital	0.5
Benzoylecgonine	Benzoylecgonine	0.10
Benzodiazepines	Alprazolam	0.02
	Chlordiazepoxide	0.2
	Clonazepam	0.02
	Diazepam	0.1
	Lorazepam	0.02
	n-Desalkylflurazepam	0.02
	Nordiazepam	0.1
	Oxazepam	0.1
	Temazepam	0.02
Cannabinoids	THC carboxylic acid	0.005
Opiates	Codeine	0.02
	Hydrocodone	0.02
	Morphine	0.02
	6-Acetylmorphine	0.01
	Oxycodone	0.02
Phencyclidine II	Phencyclidine	0.01

4.10 References

4.10.1 TDx®System Operation Manual, Abbott Laboratories, Abbott Park, IL 60064 (1992).

4.10.2 TdxFlx®/TDx® Assays Manual, Abbott Laboratories, Abbott Park, IL 60064 (1992).